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File Code: 3410 **Date:** January 22, 2001
Route To: *

Subject: Bark Beetle Infestations in the Chirachua Mountains

To: John M. McGee, Forest Supervisor
Coronado National Forest

On December 6-7, 2000 Bobbe Fitzgibbon, of the Arizona Zone Office visited the Coronado National Forest to field check bark beetle infestations in the Chiricahua and Hauchuca Mountains. Carol Boyd and Paula Medlock of your staff and sawyers from the Douglas Ranger District assisted with the destructive sampling of infested pine trees on December 6th at Pinery Canyon (N 31° 57.557', W 109° 18.782'). On December 7, 2000, Bobbe sampled infested trees in the Miller Peak Wilderness on the Sierra Vista District to determine what genus of insect was causing the tree mortality seen during the October 18, 2000 aerial detection survey (ADS) flight. This letter documents the findings made during those field checks.

In Pinery Canyon, 5 Chihuahua pines in different stages of infestation were cut. Bark samples were removed from each tree, usually at 3 locations on the bole; at the 10 ft level or below, at mid-bole and at the crown. Insects were collected, where possible. The results are recorded in Table 1.

CONDITION OF TREES SAMPLED

T-1 had been one of the earliest trees infested. No needles remained on the tree, exit holes were common along the bole and the bark could be peeled away easily.

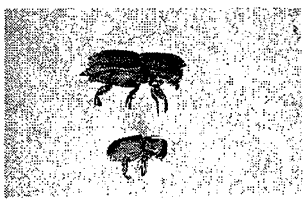
T-2 had a green top, however the mid and lower crown had faded to reddish brown.

T-3 was a fresh attacked tree. The foliage was all green, the bark was very tight and the only indications of infestations were fresh pitch tubes and boring dust.

T-4 had a reddish brown top while the lower crown was still green.

T-5 was an older attack with few exit holes. It had few needles and those were quite brown.

Bark beetles collected from the sampled trees were found to be both *Ips calligraphus* (not *Ips lecontei* as reported in the letter of 10/25/00) and at least 2 species of *Dendroctonus*; *Dendroctonus frontalis,* southern pine beetle (SPB), *Dendroctonus approximates,* the larger Mexican Pine beetle or more likely, based on investigation of the insect galleries, *Dendroctonus adjunctus*, roundheaded pine beetle (RPB). Tentative identifications were made in our laboratory; further information may be forthcoming from samples sent to the Southern Research Station. The station is studying the phoretic mites associated with SPB.



Ips calligraphus & Dendroctonus frontalis

TABLE 1

CHIRACHAUA TREE DATA

TREE	**INSECTS/ GALLERIES**	**10 FOOT LEVEL OR LOWER**	**MID-BOLE**	**TOP**
T1 Vacated	INSECTS	No beetles (nb)	nb	nb
	GALLERIES	*Dendroctonus spp.*, few *Ips spp.*	Both *Ips spp.* and *Dendroctonus spp.*	*Ips spp.* only
T5 Old dead but infested	INSECTS	*Ips spp.* 2x *Dendroctonus spp.* 1x	Most beetles *Dendroctonus spp.* a few *Ips spp.* found	Tree hung could not sample
	GALLERIES	Both *Ips spp.* and *Dendroctonus spp.*	Both *Ips spp.* and *Dendroctonus spp.*	N/A
T4 Top faded Lower crown green	INSECTS	Most beetles *Dendroctonus spp.* a few *Ips spp.* found	*Ips spp.* 2x *Dendroctonus spp.* 1x	*Ips spp.* only
	GALLERIES	*Dendroctonus ssp.* only	Both *Ips spp.* and *Dendroctonus spp.*	*Ips spp.* only
T2 Top green Lower crown faded	INSECTS	*Ips spp.* 5x . *Dendroctonus spp.* 1x	*Ips spp.* only	*Ips spp.* only
	GALLERIES	Both *Ips spp.* and *Dendroctonus spp.*	Both *Ips spp.* and *Dendroctonus spp.*	*Ips spp.* only
T3	INSECTS	*Dendroctonus spp.* only	*Ips spp.* about = *Dendroctonus spp.*	nb no attacks
	GALLERIES	Unable to remove bark intact	Unable to remove bark intact	Unable to remove bark intact

All of the infested trees sampled in the Chiricahua Mountains were Chihuahua Pine, *Pinus leiophylla*. The most numerous bark beetles in the collected samples were *Ips Calligraphus*, the sixspined ips, and *Dendroctonus frontalis,* southern pine beetle. The sixspined ips is a transcontinental species. In the south, it is one of the first species to attack drought stressed trees, often attacking in conjunction with other *Ips* and *Dendroctonus* species. SPB is considered to be the most destructive species of bark beetle in the east, but has not been recorded as a serious pest in the southwest. From the samples, it is difficult to tell which insect is making the initial attack on the individual trees, however, the *Ips* or engraver beetles were more numerous than the *Dendroctonus.* Infestations are found in scattered patches rather than the large growing "spots" that are characteristic of SPB infestation.

The results of the destructive sampling of infested trees suggests that the primary insect causing the infestation in the Chiricahuas is *Ips Calligraphus* with secondary infestation by *Dendroctonus spp.,* the most numerous species of that genus being SPB. This indicates that the infestation should follow the course of an engraver beetle outbreak. Engraver beetle outbreaks are often associated with the presence of green slash in spring (January to June), spring drought conditions such as we have been experiencing in Arizona in the last few years, stagnating stand conditions and diseases such as dwarf mistletoe.

Engraver beetle population increases in Arizona are generally of short duration although they can cause considerable tree mortality. Since ips populations may decline naturally or the beetles evacuating the trees may fly out of the immediate area to attack new hosts, it is not always necessary or desirable to suppress populations. Monitoring of beetle populations is critical prior to any suppression activities. Methods of suppression include the removal of infested trees and slash from the host type, or burning, chipping, burying, lopping and scattering, or bucking and covering slash with clear plastic. Insecticides can be used to protect high value trees in campgrounds from the spread of nearby infestations. For information on any use of pesticides, be sure to consult Doug Parker, the Regional Pesticide Coordinator. **Label directions should always be closely followed when using any pesticide**. Preventative measures are more often recommended and should be done when the insects are not at outbreak levels. A number of preventive measures can be used to hold ips populations in check. Maintaining and/or improving stand vigor, monitoring slash and standing trees for infestation particularly during drought years, confining slash creating activities to the period of July to December, avoiding management activities in the same area during multiple years are all good methods of avoiding excessive tree mortality when outbreaks occur due to conditions, such as drought, which are beyond our control.

In the Huachuca Mountains the situation was found to be similar with evidence of both *Ips spp.* and *Dendroctonus spp.* infesting trees, although no sign of SPB activity was observed. Several small infestations were field checked in Sunnyside Canyon. Larger infestations were located further into the Miller Peak Wilderness and could not be field checked at that time. The situation in the larger infestations can be presumed to be similar to those in the smaller infestations investigated. Both Chihuahua Pine and Apache Pine, *Pinus engelmannii*, were found to be infested. Nine trees were sampled. Several stages of infestation were investigated: freshly attacked trees, trees with red tops and no signs of beetle activity at the base, and trees that had been vacated. In the trees that could be sampled the galleries indicated the infestation consisted of a mixture of *Ips spp.* and *Dendroctonus spp.,* the pattern here was characteristic of RPB. Freshly attacked trees and trees with no infestation in the lower bole could not be sampled. The

largest infestation center sampled, 4 trees, showed heavy dwarf mistletoe infection. Based on the situation in the Chiricahua Mountains it is presumed that *Ips spp.* are infesting the boles higher than could be seen or sampled from the ground. Only one beetle was found in any of the infested trees and despite deformity due to a fungal infection, it appeared to be RPB.

If you have any questions about this report, feel free to contact Bobbe Fitzgibbon, 520-556-2072 or bfitzgibbon@fs.fed.us.

/s/ *John Anhold*

JOHN ANHOLD
Arizona Zone Leader
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